

RESEARCH ARTICLE

Neuroticism, coping styles and psychological distress among frontliners during COVID-19 pandemic in Kelantan, Malaysia

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ABSTRACT

The study aimed to determine the prevalence of psychological distress and explore the roles of neuroticism traits and coping styles among frontliners during the COVID-19 pandemic in Malaysia. A total of 336 frontline healthcare workers from three COVID-19 hospitals in Malaysia participated in the online survey. The measurements, including sociodemographic characteristics, presence of psychological distress, neuroticism traits, and coping styles, were assessed using the sociodemographic proforma, General Health Questionnaire (GHQ-12), Big Five Inventory, and Brief COPE scales.

Descriptive analysis with SPSS-26 were performed to determine the socio-demographic attributes of the participants, level of trait neuroticism, coping styles and psychological distress. Multiple logistic regression analysis was carried out to determine the factors significantly associated with psychological distress.

Results showed that out of 336 frontliners, 22.9% reported psychological distress. Higher trait neuroticism was significantly associated with an increased risk of psychological distress ($p < 0.05$), while religious coping was significantly associated with a decreased risk of psychological distress ($p < 0.05$). Other sociodemographic factors, such as age, gender, and years of experience, did not show significant associations with psychological distress.

The high prevalence of psychological distress among frontliners highlights the importance of addressing their mental health needs during pandemics. Interventions aimed at enhancing psychological well-being should consider targeting neuroticism traits and promoting adaptive coping strategies, such as religious coping.

Keywords: coping; COVID-19; frontliners; neuroticism; personality; psychological distress; Malaysia

1. Introduction

The first coronavirus disease (COVID-19) case was reported in late December of 2019 in Wuhan, China, which caused unexpected severe respiratory infections leading to mortality and morbidity. By 2020, COVID-19 had become recognized as a pandemic, having disastrous effects on nations worldwide. It has halted all essential human activities, destroyed the socioeconomic and cultural foundation of people everywhere, and

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placed restrictions on all interpersonal relationships and productivity. Globally, governments struggled with effective public health countermeasures in the face of rising number of cases, and the introduction of SARS-CoV-2 variants and subvariants as the pandemic entered its third year in 2022.

Healthcare frontliners, who are a crucial resource in managing the crisis are also susceptible to contracting the SARS-CoV-2 virus and as a result, may experience negative psychological consequences. Many factors could potentially contribute to this mental health burden such as increasing number of patients, increase in workload, declining availability of personal protective equipment (PPE), patient mortalities, fears of getting infected themselves, or spreading infection to family members or others, and the negative impact that occurs as a result of the constant stream of adverse news reports about COVID-19 itself^[1].

According to Strong in 1990, complex social and psychological processes are involved in the aftermath of an epidemic, and these effects can worsen if the disease is novel, unanticipated, or extremely destructive^[2]. The psychological processes involved are epidemics in themselves and may spread as fast as the disease itself affecting many groups of people. Three psycho-social epidemics can be included in epidemic psychology: the epidemic of action, the epidemic of explanation and moralization, and the epidemic of dread. When the condition is less well-known like the Covid-19 infection, these could be substantially more severe. These facts may also be associated with mistrust, anxiety about contracting an infection through any means, irrationality, false information, panic, stigmatization, avoidance, segregation, abuse, and educated people's views about the causes and consequences of disease as well as metaphysical explanations^[3].

Early in the pandemic, a study carried out among 1257 healthcare workers in China working in 34 hospitals with COVID-19 cases discovered that majority of them reported symptoms of depression (50.4 percent), anxiety, and insomnia (44.6 percent), and an alarming 71.5 percent reported psychological distress^[4]. Women, nurses, those working in the epicentre of the outbreak, and people working in front-line positions who were involved in the care for patients who have COVID-19 were more affected^[4].

As the pandemic went on, interest in mental health among frontliners continued to gain traction among researchers. Numerous research, including two systematic reviews and meta-analyses, revealed a significant frequency of mental health problems, including psychological distress of over 40% among healthcare professionals during this pandemic and throughout disease outbreaks generally^[5-8]. These studies show us the importance of screening for mild and sub-threshold syndromes as they are common and represent a target for interventions.

Personality traits, specifically neuroticism, have been identified as significant predictors of psychological distress. The most studied and widely accepted model for understanding personality psychology is the Big Five Model or Five Factor Model (FFM) of Personality^[9]. This paradigm identifies neuroticism as one of the five core dimensions of personality, alongside extraversion, openness, agreeableness, and conscientiousness. Neuroticism is characterized by a predisposition to experience negative emotional states such as anxiety, depression, and irritability. Individuals high in neuroticism tend to perceive situations as more threatening and challenging, leading to greater emotional instability and reactivity^[10].

Within the five dimensions of personality, studies have consistently demonstrated that high levels of trait neuroticism predicted pandemic-related psychopathology and poorer levels of psychological adjustment in adults^[11-14]. Those with higher levels of neuroticism are more likely to experience heightened psychological distress due to their propensity to appraise stressful situations more negatively and their reduced ability to regulate emotional responses effectively^[10]. Despite personality traits being harder to change, it carries significant importance in predicting whether individuals, particularly frontliners will be able to cope or bounce

back in the face of this COVID pandemic. Understanding the role of neuroticism helps in identifying individuals who are at greater risk for adverse mental health outcomes during the pandemic.

The Diathesis-Stress Model suggests that individuals with a predisposition vulnerability, such as high neuroticism, are more likely to experience psychological distress when exposed to significant stressors^[15] like the COVID-19 pandemic. This model posits that psychological disorders develop due to the interaction between an individual's predisposition vulnerabilities (diathesis), i.e. neuroticism and environmental stressors, i.e. the COVID-19 pandemic.

Coping is defined as the behaviours and attitudes that people employ to address challenges and stress in their environment^[16]. Lazarus and Folkman's Transactional Model of Stress and Coping conceptualizes stress as a dynamic process involving an individual's appraisal of a stressor and their coping mechanisms. The effectiveness of these coping styles can significantly influence the level of psychological distress experienced by the frontliners. Unlike personality traits, coping styles are more amenable to change. Positive and negative coping strategies have been recognized as two distinct groups of coping mechanisms. A trait of resilience is the propensity to respond more effectively to adversity, which acts as a protective barrier between psychological health and work-related stress. Psychological and life adaptations that can be active or passive, altruism, looking for team support, rational cognition through comparisons with other situations, positive information, and encouraging one-self are all examples of self-coping strategies that are positive^[17].

The interaction between neuroticism and coping styles plays a crucial role in determining psychological outcomes. Frontliners with high neuroticism may be more prone to using maladaptive coping strategies, such as avoidance or rumination, which can exacerbate their distress^[18,19]. Conversely, adaptive coping strategies, such as seeking social support or engaging in problem-solving, may mitigate the negative impact of stress^[18]. Similar associations between personality factors and both adaptive and maladaptive coping strategies have been found in other recent COVID-19 research^[19].

Personality traits and coping styles can be considered distinct constructs that both have a relationship with the development of psychiatric morbidity. Both constructs affect the behavioural adaptations in response to adverse situations. To the best of our knowledge, there is a relative scarcity of information about the relationship that trait neuroticism has in determining the effectiveness of various coping styles in preventing psychological distress. While some coping styles may confer protection from psychological distress in individuals with lower levels of trait neuroticism, it is unclear whether this effect is lost in individuals with higher levels of trait neuroticism, and ultimately which coping styles remain beneficial regardless of trait neuroticism. By recognizing neuroticism as a vulnerability factor, interventions can be tailored to support those at higher risk, potentially through targeted mental health services and stress management programs.

In this research, we aim to explore the relationship between neuroticism, coping styles, and psychological distress among frontliners during the COVID-19 pandemic. By understanding these dynamics, we can identify potential interventions to support the mental health of those who have been essential in managing the pandemic's frontlines. This study seeks to contribute to the growing body of literature on the psychological impact of COVID-19 on healthcare workers and provide insights into mitigating factors that can promote resilience and well-being in high-stress environments.

2. Materials and methods

This cross-sectional study included frontliners from three designated COVID-19 hospitals in the state of Kelantan, Malaysia, namely Hospital Raja Perempuan Zainab II, Kota Bharu, Hospital Sultan Ismail Petra, Kuala Krai, and Hospital Tumpat.

An online survey was conducted between July 2020 and February 2021. A set of online questionnaires, consisting of sociodemographic data, Big Five Inventory for neurotic personality traits, Brief COPE scale for coping styles and General Health Questionnaire (GHQ-12) for psychological distress were distributed to the healthcare workers at the designated COVID-19 hospitals through their heads of department after getting permission from the respective hospital directors.

All health care workers involved in the care of Patients Under Investigation (PUI) or confirmed COVID-19 cases were eligible to participate. The agreement to participation was explicitly established by signing an informed consent. Participants who failed to provide digital informed consent were excluded.

Sample size estimate was calculated using Power and Sample Size Program version 3.0. Based on the dichotomous formula, with an α of 0.05 and power of 0.80, using proportions from a reference study^[24], the estimated sample size required for this study was 418 after including for dropout. A total of 337 participants filled the questionnaire. Among those, 336 participants provided digital informed consent and were included in the study. 1 participant was excluded in view of no consent. Data entry and analysis was done using The Statistical Package for Social Study (SPSS) Version 26. Descriptive statistics were used to describe the socio-demographic attributes of the participants, level of neurotic personality traits, coping styles and psychological distress. Multiple logistic regression analysis was carried out to determine the factors significantly associated with psychological distress.

The processes involved in conducting this study is summarized in **Figure 1** below.

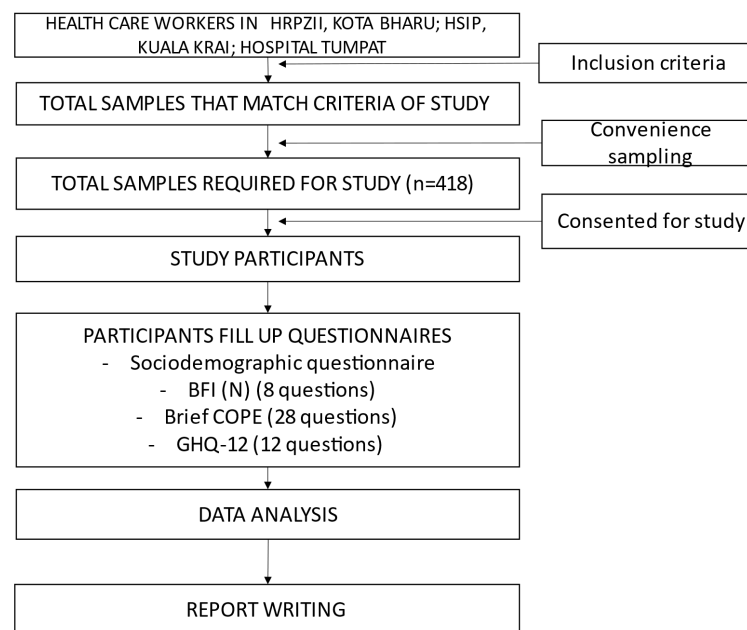


Figure 1. Study flow chart.

2.1. Instruments

2.1.1. Big five inventory

The Big Five Inventory (BFI) is a brief self-report inventory designed to measure the five-factor structure of personality²⁵. Only the neuroticism (N) items (total of 8 items) were used in the questionnaires of this study to measure trait neuroticism. Each question is measured on a 5-point Likert scale, giving a range of scores

between 8 and 40. The BFI has been reported to have high internal reliability in which Cronbach's alpha calculations ranged from 0.81 to 0.88, with a mean of 0.85.

Completion of the BFI (N) is estimated to take about 5 minutes. In the Malaysian setting, the BFI has been translated into Malay language, and cross-validated on a sample of Malaysian young adults²⁶. The Malay version of the BFI showed good convergent and discriminant validity in structural equation modelling analyses ($X^2 = 90.947$; $df = 55$; Bollen Stine $p = 0.06$; $CMIN/df = 1.654$; $SRMR = 0.05$; $RMSEA = 0.05$; $CFI = 0.96$, $TLI = 0.94$) as well as good internal consistency reliability with coefficient H value of 0.70 for the neuroticism subscale. The X^2 difference tests supported a five-factor structure of personality in the Malaysian context.

2.1.2. Brief COPE scale

The Brief Coping Orientation to Problems Experienced Inventory or (Brief COPE) inventory was used in bilingual version to evaluate different coping styles employed by the frontliners. The Brief COPE has a total of 28 items, 2 items each measuring a separate style of coping, for a total of 14 domains. Scores are measured on a 4-point Likert scale per item. The total score per coping style ranges from 2-8, with higher scores indicating more frequent use of a coping style. It has been translated and validated in Malay language. In the Malaysian setting, it has been shown to have good reliability and validity with internal consistency (Cronbach's alpha) values ranging from 0.51-0.99 for each of the items^[20].

2.1.3. 12-item General Health Questionnaire (GHQ-12)

The GHQ-12 was used in the measurement of psychological distress. The advantages of the GHQ-12 include its brevity, simplicity, and ease of completion^[21]. The questionnaire has 12-items each with 4 responses, giving scores of 0-0-1-1. A cut-off score of 4 and above was taken as an indicator of psychological distress. The Malay version of the GHQ-12 has been evaluated in detecting psychological distress in the Malaysian population and showed good reliability with Cronbach's alpha of 0.85, with 81.3% sensitivity and 75.3% specificity at a cut-off of $\frac{3}{4}$ ^[23].

The Statistical Package for Social Study (SPSS) version 26.0 was used for data entry and analysis. Descriptive statistics were used to describe the socio-demographic attributes of the participants, level of trait neuroticism, coping styles and psychological distress. Multiple logistic regression analysis was carried out to determine the factors significantly associated with psychological distress. This study has obtained ethical approval from The Human Research Ethics Committee of Universiti Sains Malaysia (JEPeM)–USM/JEPeM/COVID19-16 and the Medical Research & Ethics Committee (MREC), Ministry of Health, Malaysia; NMRR ID: NMRR-20-901-54844.

3. Results

3.1. Sociodemographic characteristics

The participants had an average age of 35.70 years ($SD=7.55$). Most participants were Malay Muslim females and were married (79.2%). In terms of educational background, most participants had Sijil Pelajaran Malaysia (SPM), Sijil Tinggi Persekolahan Malaysia (STPM), diploma or A-Level equivalents (54.2%). Over one-third of the participants (38.9%) worked in Hospital Sultan Ismail Petra, Kuala Krai, 38.6% worked in Hospital Raja Perempuan Zainab II, and 22.5% worked in Hospital Tumpat. Of the 336 participants, 315 (93.8%) were involved in clinical work. The average years of experience of the participants working in healthcare was 10.80 years ($SD=7.26$). The sociodemographic characteristics are summarized in **Table 1**.

Table 1. Sociodemographic background of the participants (n = 336).

Variables	Frequency, n (%)
Age	35.70 (7.55)*
Sex	
Male	103 (30.7)
Female	233 (69.3)
Ethnicity	
Malay	329 (97.9)
Chinese	6 (1.8)
Bumiputera	1 (0.3)
Marital status	
Single	70 (20.8)
Married	266 (79.2)
Religion	
Islam	329 (97.9)
Buddha	5 (1.5)
Christian	2 (0.6)
Education	
Master's degree	15 (4.5)
Bachelor's degree	139 (41.4)
SPM/STPM/A-Level/Diploma	182 (54.2)
Place of work	
Hospital Raja Perempuan Zainab II	129 (38.6)
Hospital Sultan Ismail Petra	130 (38.9)
Hospital Tumpat	75 (22.5)
Nature of work	
Clinical	315 (93.8)
Non-clinical	21 (6.3)
Years of experience	10.80 (7.26)*
Days worked during COVID outbreak	141.25 (68.74)*
Worked >9hour shifts	
Yes	84 (25)
No	252 (75)
Medical illness	
Yes	22 (6.5)
No	314 (93.5)

*Mean (SD)

3.2. Neuroticism, coping styles, and psychological distress

The BFI (N) total score mean was 19.76 (SD = 5.06) with a range of values between eight and 38. Apart from item number three, all the remaining items had mean scores below three. The individual item mean scores are summarized in **Table 2**.

Table 2. Trait neuroticism using BFI (N) among healthcare workers (n = 336).

Trait neuroticism item	Mean (SD)
BFI (N) Total Score	19.76 (5.06)
I am someone who...	
1) Is depressed, blue	1.86 (0.95)
2) Is relaxed, handles stress well	2.07 (0.81)
3) Can be tense	3.25 (0.99)
4) Worries a lot	2.78 (1.07)
5) Is emotionally stable, not easily upset	2.24 (0.92)
6) Can be moody	2.67 (1.10)
7) Remains calm in tense situations	2.46 (0.89)
8) Gets nervous easily	2.43 (0.99)

The coping styles most used among the participants were tied between acceptance and religious coping, with a mean of 3.32 (SD = 0.79) respectively. The least used coping style among the participants was substance use with a mean of 1.04 (SD = 0.24). **Table 3** summarizes the mean (SD) of individual coping styles used among frontliners.

Table 3. Coping styles using Brief-COPE among healthcare workers (n = 336).

Coping style	Mean (SD)
Acceptance	3.32 (0.79)
Religion	3.32 (0.79)
Positive reframing	3.02 (0.78)
Use of informational support	2.88 (0.84)
Active coping	2.86 (0.73)
Planning	2.82 (0.79)
Emotional support	2.72 (0.82)
Self-distraction	2.64 (0.70)
Humor	2.04 (0.76)
Venting	2.03 (0.83)
Denial	1.61 (0.70)
Self-blame	1.54 (0.73)
Behavioral disengagement	1.42 (0.63)
Substance use	1.04 (0.24)

Seventy-seven participants (22.9%) scored four or higher on the GHQ-12 indicating psychological distress, whereas the remaining 259 participants (77.1%) had a total score of less than four indicating no psychological distress. **Figure 2** shows the frequency of participants with psychological distress.

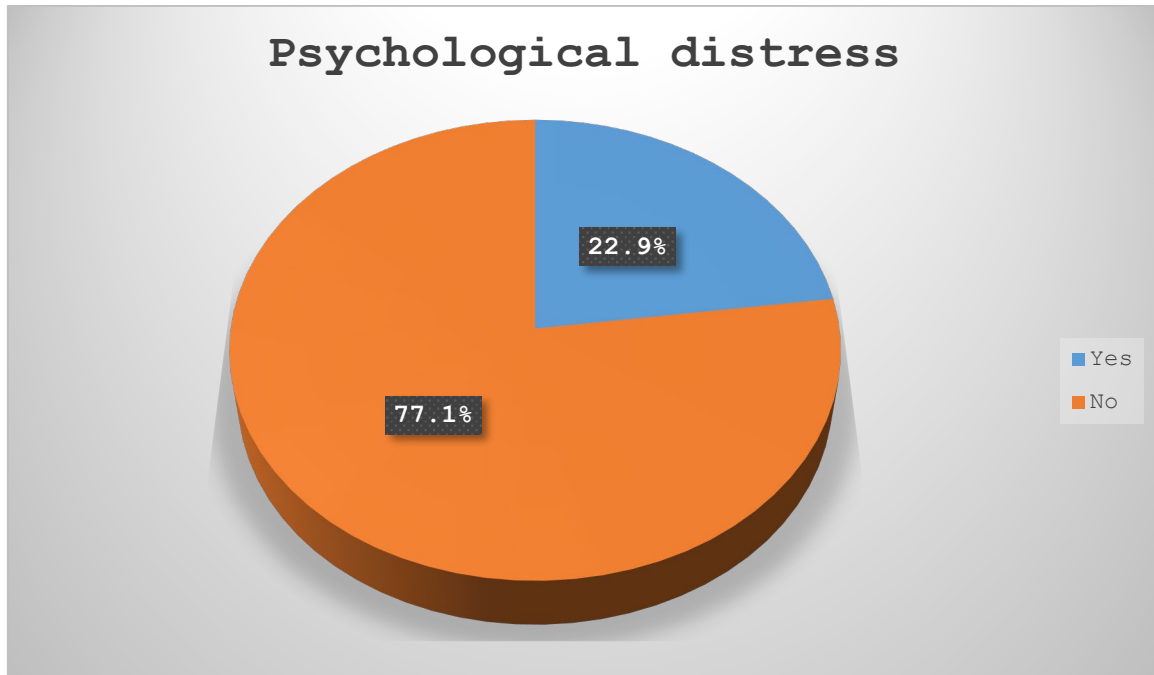


Figure 2. Psychological distress using GHQ-12 among healthcare workers (n = 336).

3.3. Factors associated with psychological distress among frontliners

Table 4 shows the simple and multivariable logistic regression analysis respectively, exploring the associations between sociodemographic profiles, trait neuroticism and the various coping styles with psychological distress. After adjusting for sociodemographic variables and all significant coping styles, only trait neuroticism and religious coping style were found to have significant association with psychological distress in the final model using multivariable logistic regression. For every one-point increase in Total BFI (N) score, there will be 34.8% increased odds of psychological distress ($p < 0.001$, adjusted OR=1.35, 95% CI= 1.24-1.46). For every one-point increase in religious coping, there will be 41.9% decreased odds of psychological distress ($p = 0.009$, adjusted OR= 0.58, 95% CI= 0.39-0.88).

Table 4. Factors associated with psychological distress among the participants (n = 336).

Variables	Simple logistic regression			Multiple logistic regression		
	Regression coefficient (b)	Crude OR (95% CI)	p-value	Adjusted b	Adjusted OR (95% CI)	p-value
Age (years)	-0.09	0.91 (0.87, 0.95)	<0.001*			
Gender		1				
Male	0	1.47				
Female	0.38	(0.82, 2.62)	0.19*			
Ethnicity		1				
Malay	0	2.58				
Non-Malay	0.95	(0.57, 11.81)	0.22*			
Marital status		1				
Married	0	2.95				
Single	1.08	(1.67, 5.22)	<0.001*			

Religion		1				
Muslim	0	2.58				
Non-Muslim	0.95	(0.57, 11.81)	0.221*			
Experience in healthcare (years)	-0.09	0.91 (0.87, 0.95)	<0.001*			
Days worked with COVID	0.003	1.003 (0.999, 1.01)	0.162*			
BFI (N) Total Score	0.29	1.35 (1.24, 1.46)	<0.001**	0.29	1.35 (1.24, 1.46)	<0.001**
Active coping	-0.33	0.72 (0.51,1.01)	0.059*			
Use of informational support	0.25	1.29 (0.94,1.78)	0.114*			
Positive reframing	-0.21	0.81 (0.58,1.11)	0.195*			
Planning	-0.39	0.67 (0.48,0.93)	0.017*			
Acceptance	0.48	1.06 (1.11,2.39)	0.013*			
Religion	-0.53	0.58 (0.42,0.81)	0.001*	-0.54	0.58 (0.39, 0.88)	0.009**
Self-blame	0.66	1.94 (1.40,2.69)	<0.001*			
Self-distraction	0.73	2.08 (1.39,3.09)	<0.001*			
Denial	0.23	1.26 (0.89,1.79)	0.18*			
Substance use	1.20	3.34 (1.29,8.62)	0.01*			
Behavioral disengagement	0.77	2.17 (1.49,3.17)	<0.001*			

Note: *Significant variables with $p < 0.25$ using simple logistic regression were included in the multiple logistic regression analysis.

**Variables with $p < 0.05$ were retained in the final model.

For Multiple Logistic Regression, Forward LR method was applied. No multicollinearity and no 2-way interactions were found. Classification table showed 79.2% correctly classified. Hosmer-Lemeshow test showed p -value=0.765. Area under Receiver Operating Characteristics (ROC) curve was 83.0%.

4. Discussion

Protecting frontliners or healthcare workers (HCW) is an important component of public health measures for addressing the COVID-19 pandemic and thus special interventions to promote mental well-being in HCWs exposed to COVID-19 need to be immediately implemented. Understanding the relationship that neurotic

personality traits and coping styles have in the development of psychological distress among HCWs, during the pandemic, will aid in making psychological interventions more focussed.

This cross-sectional survey enrolled 336 frontliners from the three designated COVID-19 hospitals in the state of Kelantan, Malaysia, who were involved in the treatment and care of suspected and confirmed COVID-19 cases. Our study showed that, 22.9% of all the frontliners reported psychological distress. Comparing this finding to the prevalence of psychological distress among HCWs treating COVID-19 patients^[24,26,27] and among the general population during the pandemic^[28] in other parts of the world, it is noticeably less common, with those estimates being 40.2 to 71.5%, and 34.43 to 38% respectively. It is important to note that there is insufficient data on the prevalence of psychological distress within this specific sample before the pandemic began.

One important factor that could give rise to lower estimates of psychological distress is the number of cases of COVID-19 in the state of Kelantan during the study period. While the first imported cases in Malaysia were reported as early as 25 January 2020, the first case in Kelantan was reported on 13th March 2020. The COVID pandemic came in multiple waves and saw several peaks and troughs over the last few years since the pandemic began. Furthermore, the number of active cases and deaths were unequally distributed between the different states in Malaysia. Kelantan was among the states that had fewer number of cases compared to other states like Selangor and Sabah. In the early phase of the pandemic, there was much uncertainty which caused fear and anxiety among frontliners. The Ministry of Health actively provided organizational support in the form of knowledge dissemination on COVID-19, regular global and local updates, resources like adequate personal protective equipment and other interventions. This could possibly have contributed to increased confidence, individual resilience, positive attitudes, and a gradual decrease in anxiety levels among the frontline HCWs.

Our study examined several socio-demographic risk factors such as age, gender, ethnicity, marital status, religion, education level, and occupational factors such as nature of work, years of experience working in health care that might be predictors of psychological distress among the target population, none of which remained statistically significant in the multiple regression analysis.

Studies that examined age as a risk factor for psychological distress among the frontliners during COVID-19 revealed inconsistent results. While many studies showed younger age of frontliners to be associated with higher likelihood and more severe levels of psychological symptoms^[25], other studies showed that older age was associated with increased risk of developing higher levels of psychological distress^[29-31], or that age was not an associated factor for developing psychological distress^[25]. Studies that examined marital status as a risk factor for psychological distress among frontliners during COVID-19 pandemic also showed inconsistent findings. Some studies revealed those who were single to have higher severity of psychological distress^[31-33], while other researchers found that being married during the COVID-19 pandemic was a risk factor for psychological distress^[38,40,41], and some studies found no association between marital status to psychological distress among frontliners during outbreaks^[25]. Most studies that examined education level in relation to psychological distress among frontliners during the COVID pandemic found no significant association^[25]. Similarly, many studies that examined work experience as a potential risk factor for psychological distress did not find a significant association^[36,37].

One recent systematic review that included data from 143 246 Frontliners across 138 studies revealed that of the many sociodemographic factors studied, only female gender and working as a nurse consistently predicted psychological distress in majority of the studies across multiple past epidemics including COVID-

19^[25]. However, due to the small sample size, our study was unable to replicate this finding that female gender was substantially related with psychological distress among frontliners during the COVID-19 pandemic.

Our study's primary objective was to determine the association between coping styles and trait neuroticism with psychological distress. The multiple regression analysis demonstrates that trait neuroticism was positively linked with psychological distress. Only religious coping remained significant after controlling for confounders in the multiple logistic regression analysis and revealed a significant negative association with psychological distress.

Neuroticism involves negative emotionality and can influence how much a person finds the outside world upsetting, dangerous, or unsafe, trait neuroticism has been linked to a number of psychopathologies^[38]. Most of the published reports on trait neuroticism, associated factors and coping strategies during the COVID-19 pandemic were conducted outside Malaysia. In the past, trait neuroticism had been linked with poorer mental health outcomes during the SARS pandemic^[39]. In addition, research has shown that the level of neuroticism is crucial when dealing with the COVID-19 pandemic since it heightens emotional reactivity and lowers stress tolerance^[40]. Sebri and colleagues discovered that neuroticism and dysfunctional coping were two elements that were particularly significant predictors of anxiety in 2021^[41]. According to their research, cognitive reappraisal, emotion-focused coping, and extraversion serve as worry-protective qualities, whereas expressive suppression, dysfunctional and problem-focused coping, and neuroticism are associated with more anxiety. According to Liu et al in 2021, those with higher degrees of neuroticism sense threat more acutely and with poorer levels of efficacy, which raises stress levels^[42]. Another study found that those with higher levels of trait neuroticism, COVID-related fear, being female, young, and having a prior mental diagnosis or trauma were more likely to experience psychological distress^[43]. Adults, however, who were married, engaged in physical activity, wealthy, and had high levels of trait resilience and coping mechanisms, were the ones who were best protected. Grigutyte *et al.*, in their study conducted recently in 2021, observed that psychological well-being was negatively associated with neuroticism but positively related to other personality traits^[44].

The significant association between religious coping and mental health outcome in this study provides insight on psychological interventions for the HCWs, particularly during future pandemics. For example, the intervention could be focused on enhancing positive religious coping utilizing therapies focused on religion and spirituality. Several studies during the COVID-19 pandemic, have showed the association of positive religious coping with a reduction in psychological morbidities optimizing the mental health outcome in HCWs^[45-48]. One study among Egyptian doctors during the pandemic found that participants considered putting their faith in God to be a helpful stress-reduction strategy^[45]. In two other studies, religious coping was analysed as either positive religious coping, which denotes having a secure and safe relationship with the sacred, or negative religious coping, which denotes the struggle and conflict with the holy^[46,47]. It was discovered that higher levels of the latter religious coping had a substantial positive relationship with psychological discomfort. In one of the studies, higher levels of positive religious coping were found to be protective against psychological discomfort^[47]; however, in the former study, there was no significant link between positive religious coping and anxiety or depressive symptoms^[46].

This study is limited by several factors. Firstly, the cross-sectional study design offers only a snapshot of the variables examined and limits the ability to make causal inferences. Secondly, the purposive sampling method was used, which could partially explain the lower-than-expected proportion of participants reporting psychological distress, and it also limits the generalizability of the findings. Furthermore, the study has a relatively small sample size and was carried out during a limited time during the COVID-19 outbreak in Malaysia.

In conclusion, findings of the study further strengthen the available evidence on the significant role of personality traits, particularly trait neuroticism as well as coping styles play when dealing with infectious disease outbreaks. It was our expectation to identify various coping styles as risk or resilience factors in the development of psychological distress, however our findings suggest that the effect of high levels of trait neuroticism outweighs any risk or protection conferred by various coping styles, apart from religious coping. This study may serve as a stimulus for the Ministry of Health Malaysia in developing guidelines for mental health safeguard of HCWs during pandemics as this COVID-19 experience in Malaysia has shown the crucial need to address this issue.

5. Conclusions

This cross-sectional survey of 336 frontliners in Kelantan, Malaysia, revealed that 22.9% reported psychological distress, which is lower than in other studies of healthcare workers and the general population during the COVID-19 pandemic. Factors contributing to this lower prevalence may include the state's lower number of COVID-19 cases, allowing for better preparedness and lighter workloads for frontliners. While certain socio-demographic factors showed associations with psychological distress in unadjusted analyses, these associations did not remain significant after adjusting for confounders. Trait neuroticism was positively associated with psychological distress, while religious coping showed a significant negative association. These findings highlight the complex interplay of personality traits and coping mechanisms in the context of a pandemic.

6. Limitations

This study has several limitations.

The study was undertaken in the state of Kelantan only, where the COVID-19 cases were relatively lower than some states in Malaysia. In addition, our cohort is limited to HCWs who represent a group with access to COVID-19 resources and safety standard procedures from the Ministry of Health. Furthermore, the small sample size and limited timeframe of the study during the COVID-19 outbreak in Malaysia, also restrict generalizability of the findings.

Additionally, reliance on self-reported data of survey participants may introduce bias, and psychiatric comorbidity may be either under or overestimated.

7. Future directions

Future research could employ longitudinal designs to better understand the trajectory of psychological distress among frontliners over time. Additionally, larger studies with more diverse samples could help elucidate the role of various socio-demographic factors and coping mechanisms in predicting psychological distress. Exploring interventions targeted at reducing trait neuroticism or enhancing adaptive coping strategies could also be valuable in mitigating psychological distress among frontliners.

Author contributions

Conceptualization, BCS and MAY; methodology, BCS, RSB and MAY; software, BCS and RSB; formal analysis, BCS and RSB; resources, BCS and MAY; data curation, BCS; writing original draft preparation, BCS and MAY; writing review and editing, BCS, RSB, ACR and MAY; supervision, RSB, ACR and MAY. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.

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